Supplementary appendix

Risks of recurrent stroke and all serious vascular events after spontaneous intracerebral haemorrhage: pooled analyses of two population-based studies

Web appendix 1 Search strategy

1. exp cerebral haemorrhage/or exp intracranial haemorrhage, hypertensive/
2. (intracerebral adj1 h?emrrhag*) or (h?emorrhag* adj1 stroke) or (intracranial adj1 h?emorrhage)
3. (intracerebral adj1 bleed*) or (intracranial adj1 bleed*)
4. Recurrence/
5. recurrent stroke or recurrent h?emorrhagi* stroke or recurrent intracerebral h?emorrhage or recurrent intracerebral bleed*
6. 1 or 2 or 3
7. 4 or 5
8. 6 and 7
9. Limit 8 to English language
10. Limit 9 to "all adult (19 plus years)"

Web appendix 2 Characteristics of all patients with first-in-study-period ICH at diagnosis and hospital discharge in OXVASC (2002-2018) vs. LATCH (2010-2013)

	OXVASC (n=255)	LATCH[‡] (n=419)	p
Age (mean/SD)	76/13	75/12	0.25
Male sex	126 (49.4)	194 (46.3)	0.43
NIHSS (median, IQR)**	8 (4-16)	n/a	n/a
Location - lobar	109 (43.1)	208 (49.6)	0.10
Medical history			
Previous occlusive vascular disease*	83 (32.5)	134 (32.1)	0.90
Hypertension	157 (61.6)	272 (64.9)	0.36
Diabetes	36 (14.1)	47 (11.2)	0.27
Hyperlipidaemia	59 (23.1)	75 (17.9)	0.10
Atrial fibrillation	57 (22.4)	90 (21.5)	0.80
Current smoking†	24 (9.7)	92 (22.1)	<0.0001
Medication before ICH			
Antithrombotic drugs†	122 (47.8)	222 (53.0)	0.20
Anticoagulant drugs	54 (21.2)	56 (13.4)	0.008
Antiplatelet drugs	73 (28.6)	177 (42.2)	0.0004
Antihypertensive drugs	127 (49.8)	202 (48.2)	0.69
Statins	66 (25.9)	156 (40.1)	0.0002
Medication at hospital/clinic discharge#	(n=143)	(n=235)	
Antithrombotic drugs††	8 (5.6)	14 (6.0)	0.88
Anticoagulant drugs	1 (0.7)	6 (2.6)	0.20
Antiplatelet drugs	7 (4.9)	9 (3.8)	0.62
Antihypertensive drugs	104 (72.7)	125 (53.2)	0.0002

Numbers are presented as n (%) unless otherwise stated. * Previous occlusive vascular disease included any history of transient ischaemic attack, stroke, myocardial infarction or peripheral vascular disease. **data missing for n=6 in OXVASC and data not available in LATCH. ‡missing data in LATCH: TIA/stroke (n=1), MI/PVD (n=1), hypertension (n=1), hyperlipidaemia (n=1), AF (n=1), smoking (n=2), statins (n=30). † n=16 on both anticoagulant and antiplatelet drugs. †† n=1 patients on both anticoagulant and antiplatelet drugs. #excluding patients who died before discharge.

Web appendix 3 Characteristics of all OXVASC (2002-2018) patients with first-ever ICH at diagnosis and hospital discharge stratified by ICH location

	Total (n=255)*	Lobar ICH (n=109)	Non-lobar ICH (n=144)	p
Age (mean/SD)	75.5/13.1	76.4/12.0	74.8/13.8	0.34
Male sex	126 (49.4)	50 (45.9)	76 (52.8)	0.28
Diagnostic methods				
CT alone	214 (83.9)	87 (79.8)	125 (86.8)	0.38
MRI alone	4 (1.6)	3 (2.8)	1 (0.7)	
CT and MRI	31 (12.2)	16 (14.7)	15 (10.4)	
Autopsy	6 (2.4)	3 (2.8)	3 (2.1)	
NIHSS (median, IQR)**	8 (4-16)	9 (4-17)	8 (4-15)	0.94
Disabling or fatal#	199 (78.0)	85 (78.0)	112 (77.8)	0.97
Blood pressure (mmHg) at onset (mean/SD)				
Systolic blood pressure	181	170	189	0.0001
Diastolic blood pressure	92	88	94	0.03
Medical history				
Previous transient ischaemic attack or stroke	72 (28.2)	39 (35.8)	33 (22.9)	0.03
Myocardial infarction or peripheral vascular disease	21 (8.3)	15 (13.8)	6 (4.2)	0.006
Hypertension	157 (61.6)	58 (53.2)	98 (68.1)	0.02
Diabetes	36 (14.1)	14 (12.8)	22 (15.3)	0.58
Hyperlipidaemia	59 (23.1)	24 (22.0)	35 (24.3)	0.67
Atrial fibrillation	57 (22.4)	24 (22.0)	33 (22.9)	0.87
Current smoker‡	24 (9.7)	10 (9.5)	14 (9.9)	0.92
Medication before ICH				
Antithrombotic drugs†	122 (47.8)	55 (50.5)	66 (45.8)	0.47
Anticoagulant drugs	54 (21.2)	27 (24.8)	27 (18.8)	0.25
Antiplatelet drugs	73 (28.6)	30 (27.5)	42 (29.2)	0.77
Antihypertensive drugs	127 (49.8)	49 (45.0)	77 (53.5)	0.18
Statins	66 (25.9)	36 (33.0)	29 (20.1)	0.02
Medication at hospital/clinic discharge#	(n=143)	(n=60)	(n=83)	
Antithrombotic drugs	8 (5.6)	6 (10.0)	2 (2.4)	0.05
Anticoagulant drugs	1 (0.7)	1 (1.7)	0 (0)	0.24
Antiplatelet drugs	7 (4.9)	5 (8.3)	2 (2.4)	0.11
Antihypertensive drugs	104 (72.7)	34 (56.7)	70 (84.3)	0.0002
Discharge location	(n=143)	(n=60)	(n=83)	0.70
Home	67 (46.9)	28 (46.7)	39 (47.0)	
Community hospital/rehabilitation	71 (49.7)	29 (48.3)	42 (50.6)	
Nursing home/carer/sheltered accommodation	5 (3.5)	3 (5.0)	2 (2.4)	

Numbers are presented as n (%) unless otherwise stated. *n=2 with unknown location due to out-of-area death and no imaging was not accessible; **data missing for n=6. ‡data missing for n=7. # defined as modified Rankin Scale 3 or above. † n=5 patients on both anticoagulant and antiplatelet drugs. #excluding patients that died before discharge.

Web appendix 4 Characteristics of all LATCH (2010-2013) patients with first-ever ICH at diagnosis and hospital discharge stratified by ICH location

	Total‡ (n=419)	Lobar ICH (n=208)	Non-lobar ICH (n=211)	p
Age (mean/SD)	74.3/12.4	75.0/11.4	73.6/13.2	0.26
Male sex	194 (46.3)	89 (42.8)	105 (49.8)	0.15
Diagnostic methods				
CT	404 (96.4)	199 (95.7)	205 (97.2)	
MRI	10 (2.4)	6 (2.9)	4 (1.9)	
Autopsy	5 (1.2)	3 (1.4)	2 (0.9)	
ICH volume (cm^3; median/IQR)*		38 (13-87)	12 (4-31)	
Medical history				
Previous transient ischaemic attack or stroke	97 (23.2)	39 (18.8)	58 (27.5)	0.06
Myocardial infarction or peripheral vascular disease	58 (13.9)	25 (12.0)	33 (15.7)	0.28
Hypertension	272 (65.1)	120 (57.7)	152 (72.4)	0.002
Diabetes	47 (11.2)	23 (11.1)	24 (11.4)	0.92
Hyperlipidaemia	75 (17.9)	34 (16.4)	41 (19.5)	0.40
Atrial fibrillation	90 (21.5)	39 (18.8)	51 (24.3)	0.17
Current smoker	92 (22.1)	44 (21.4)	48 (22.8)	0.73
Medication before ICH				
Antithrombotic drugs†	222 (53.0)	117 (56.3)	105 (49.8)	0.18
Anticoagulant drugs	56 (13.4)	25 (12.0)	31 (14.7)	0.42
Antiplatelet drugs	177 (42.2)	98 (47.1)	79 (37.4)	0.05
Antihypertensive drugs	202 (48.2)	93 (44.7)	109 (51.7)	0.16
Statins	156 (40.1)	81 (41.5)	75 (38.7)	0.56
Medication at hospital/clinic discharge#	(n=235)	(n=122)	(n=113)	
Antithrombotic drugs††	14 (6.0)	6 (4.9)	8 (7.1)	0.48
Anticoagulant drugs	6 (2.6)	4 (3.3)	2 (1.8)	0.46
Antiplatelet drugs	9 (3.8)	3 (2.5)	6 (5.3)	0.26
Antihypertensive drugs	125 (53.2)	55 (45.1)	70 (61.9)	0.01

Numbers are presented as n (%) unless otherwise stated.*ICH volume calculated using ABC/2 method based on CT images. Missing for patients diagnosed by MRI or at autopsy (N=15). ‡missing data: TIA/stroke (n=1), MI/PVD (n=1), hypertension (n=1), hyperlipidaemia (n=1), AF (n=1), smoking (n=2), statins (n=30). #excluding patients that died prior to discharge. † n=11 patients on both anticoagulant and antiplatelet drugs. †† n=1 patient on both anticoagulant and antiplatelet drugs.

Web appendix 5 Characteristics of all patients with first-ever intracerebral haemorrhage at diagnosis and hospital discharge, stratified by co-morbid atrial fibrillation

	Total (n=673) ‡	AF (n=147)	No AF (n=526)	p
Mean age, y (SD)	74.7 (12.6)	79.8 (9.7)	73.3 (13.0)	<0.0001
Male sex	320 (47.5)	73 (49.7)	247 (47.0)	0.56
ICH location**				
Lobar	317 (47.2)	63 (42.9)	254 (48.5)	0.23
Non-lobar	354 (52.8)	84 (57.1)	270 (51.5)	
Medical history				
Previous occlusive vascular disease*	218 (32.4)	74 (50.3)	144 (27.4)	<0.0001
Hypertension	428 (63.6)	129 (87.8)	299 (56.8)	<0.0001
Diabetes	83 (12.3)	26 (17.7)	57 (10.8)	0.03
Hyperlipidaemia	134 (19.9)	42 (28.6)	92 (17.5)	0.003
Current smoker	116 (17.5)	13 (9.0)	103 (19.8)	0.002
Medication before ICH				
Antithrombotics†	344 (51.1)	130 (88.4)	214 (40.7)	<0.0001
Anticoagulant drugs	110 (16.3)	84 (57.1)	26 (4.9)	<0.0001
Antiplatelet drugs	250 (37.1)	58 (39.5)	192 (36.5)	0.51
Antihypertensive drugs	329 (48.9)	119 (81.0)	210 (39.9)	<0.0001
Statins	222 (34.5)	68 (46.3)	154 (31.0)	0.001
Medication at hospital/clinic discharge#	(n=378)	(n=84)	(n=294)	
Antithrombotic drugs††	22 (5.8)	14 (16.7)	8 (2.7)	<0.0001
Anticoagulant drugs	7 (1.9)	5 (6.0)	2 (0.7)	0.002
Antiplatelet drugs	16 (4.2)	10 (11.9)	6 (2.0)	<0.0001
Antihypertensive drugs	229 (60.6)	68 (81.0)	161 (54.8)	<0.0001

Numbers are presented as n (%) unless otherwise stated. ICH=intracerebral haemorrhage. AF=atrial fibrillation. ‡missing data in LATCH: TIA/stroke (n=1), MI/PVD (n=1), hypertension (n=1), hyperlipidaemia (n=1), AF (n=1), smoking (n=2), statins (n=30); missing data in OXVASC: smoking (n=8).**n=2 with unknown location due to out-of-area death and no imaging was not accessible. *previous occlusive vascular disease included any history of transient ischaemic attack, stroke, myocardial infarction or peripheral vascular disease† n=16 on both anticoagulant and antiplatelet drugs; #excluding patients that died prior to discharge. †† n=1 on both anticoagulant and antiplatelet drugs.

Web appendix 6 Details of recurrent intracerebral haemorrhage (ICH) and ischaemic stroke (IS) stratified by the location of the index ICH in OXVASC and LATCH

	Recurrent ICH:		IS:	
	Index lobar	Index Non-lobar	Index lobar	Index Non-lobar
OXVASC:	**(n=11)**	**(n=4)**	**(n=4)**	**(n=3)**
Location of recurrent event				
Lobar	11 (100.0%)	2 (50.0%)	NA	NA
Non-lobar	0 (0)	2 (50.0%)	NA	NA
Severity of recurrent event				
Fatal	4 (36.4%)	2 (50.0%)	1 (25.0%)	1 (33.3%)
Disabling	6 (54.5%)	2 (50.0%)	2 (50.0%)	1 (33.3%)
Non-disabling	1 (9.1%)	0 (0)	1 (25.0%)	1 (33.3%)
Use of antithrombotics before recurrent event				
Never on antithrombotics	4 (36.4%)	4 (100.0%)	0 (0)	1 (33.3%)
Antiplatelets stopped & not restarted after index ICH	5 (45.5%)	0 (0)	1 (25.0%)	0 (0)
Anticoagulants stopped & not restarted after index ICH	1 (9.1%)	0 (0)	2 (50.0%)	2 (66.7%)
Antithrombotics restarted after index ICH	1 (9.1%)	0 (0)	1 (25.0%)	0 (0)
Use of antihypertensives before recurrent event	3 (27.3%)	3 (75.0%)	3 (75.0%)	3 (100.0%)
Mean follow-up blood pressure ≤130/80mmHg	6 (75.0%)*	1 (33.3%)*	1 (25.0%)	1 (50.0%)*
LATCH:	**(n=22)****	**(n=9)**	**(n=8)**	**(n=10)**
Location of recurrent event				
Lobar	21 (100%)	3 (33.3%)	NA	NA
Non-lobar	0 (0)	6 (66.7%)	NA	NA
Severity of recurrent event				
Fatal	6 (27.3%)	3 (33.3%)	1 (1.3%)	2 (20%)
Non-disabling	16 (72.7%)	6 (66.7%)	7 (8.7%)	8 (80%)
Use of antithrombotics before recurrent event				
Never on antithrombotics	11 (50.0%)	4 (44.4%)	3 (37.5%)	4 (40.0%)
Antiplatelets stopped & not restarted after index ICH	7 (31.8%)	1 (11.1%)	2 (25.0%)	3 (30.0%)
Anticoagulants stopped & not restarted after index ICH	1 (4.5%)	0 (0)	0 (0)	1 (10.0%)
Antithrombotics restarted after index ICH	3 (13.6%)	2 (22.2%)	2 (25.0%)	1 (10.0%)
New antithrombotics initiated during follow-up	0 (0)	2 (22.2%)	1 (12.5%)	1 (10.0%)
Use of antihypertensives before recurrent event	11 (50.0%)	6 (66.7%)	6 (75.0%)	7 (70.0%)
Mean follow-up blood pressure ≤130/80mmHg	4 (33.3%)**	2 (28.5%)**	0 (0)**	0 (0)**

NA=not applied, ICH=intracerebral haemorrhage, IS=ischaemic stroke. *follow-up blood pressure available for 8/11, 3/4, 2/3 respectively for recurrent ICH after index lobar, non-lobar ICH and recurrent IS after non-lobar ICH. ** follow-up blood pressure available for 12/22, 7/9, 7/8, and 9/10 respectively for recurrent events after index lobar and non-lobar ICH. One patient with recurrent ICH was identified at post-mortem, therefore no location information available.